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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/807,252

03/24/2004

Masanori Takeuchi

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EXAMINER

DHARIA, PRABODH M

ART UNIT

PAPER NUMBER

2629

MAIL DATE

DELIVERY MODE

10/09/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/807,252

Applicant(s)

TAKEUCHI ET AL.

Examiner

Prabodh M. Dharia

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 August 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 15-56 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.
2. **Status:** Please all the replies and correspondence should be addressed to examiner's new art unit 2629. Receipt is acknowledged of papers submitted on 08-30-2007 under response to restriction requirements with election of claims 1-14 of Group I, without traverse, which have been placed of record in the file. Claims 1-14 are pending in this action.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
4. Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawahara et al. (US 2001/0028347 A1) in view of Mucci et al. (US 6,512,854 B1).

Regarding Claim 1, Kawahara et al. discloses a display apparatus (abstract, page paragraph 2) which expresses luminance by varying light emission time length (see abstract, page 1, paragraph 9, page 5, paragraphs 86-90, page 8, paragraph 122, page 9, paragraph 135, page 10, paragraph 141, discloses how achieves the luminance by varying light emission time length.) and displays gray scale by using a subfield method (page 5, paragraphs 86-90, page 8,

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paragraph 122, page 9, paragraph 135, page 10, paragraph 141), comprising: and an error diffusion circuit receiving said second intermediate image signal and increasing the number of gray scale levels by simulating additional gray scale levels through error diffusion (pages 7,8, paragraphs 110-116 discloses by error diffusion process increases number of gray scale level).

However, Kawahara et al. fails to disclose a gain control circuit compressing the number of gray scale levels of an input signal.

However, Mucci et al. discloses a gain control circuit compressing the number of gray scale levels of an input signal (Col. 1, Line 60 to Col. 2, Line 45) and outputting a first intermediate image signal with a first number of gray scale levels; a sub gain control circuit receiving said first intermediate image signal (Col. 8, line 65 to Col. 9, Line 56), compressing the number of gray scale levels of said first intermediate image signal, and outputting a second intermediate image signal with a second number of gray scale levels (Col. 1, Line 60 to Col. 2, Line 45, Col. 8, Line 65 to Col. 9, Line 56).

The reason combine is to be able to achieve the range of intensities achievable by a video display is also referred to as the dynamic range or intensity range of the display by adjusting the compression (i.e., mapping function) of the dynamic range of the received signal power to the dynamic range afforded by the display system. For example, a signal value may be represented by a sixteen bits value ranging from zero to approximately 64,000, whereas the video display may support only a dynamic range of eight bits, i.e., 0 to 255. The compression function maps the 12 bits signal dynamic range to the 8 bit dynamic range of the display.

Thus it is obvious to one in the ordinary skill in the art at the time of invention was made to incorporate Mucci et al. teaching in teaching of Kawahara et al. to is to be able to achieve the

range of intensities achievable by a video display is also referred to as the dynamic range or intensity range of the display by adjusting the compression (i.e., mapping function) of the dynamic range of the received signal power to the dynamic range afforded by the display system. This compression function is generally non-linear and is intended to enhance the presentation of the information relative to the noise (Col. 2, lines 1-14).

Regarding Claim 2, Kawahara et al. discloses a first subfield arrangement setting unit forming one field with a plurality of subfields so that the number of gray scale levels becomes equal to said first number of gray scale levels; and a second subfield arrangement setting unit forming one field with a plurality of subfields so that the number of gray scale levels becomes equal to said second number of gray scale levels which is smaller than said first number of gray scale levels (page 1, paragraph 9 discloses subfield assigned different weight of luminescent, directly related to gray scale, pages 7, 8, paragraphs 110-119, page 11, paragraphs 167-170, page 12, paragraphs 171,178-180).

Regarding Claim 3, Kawahara et al. discloses first subfield arrangement setting unit assigns a weight 1 to a first subfield and a weight 3 or larger to a second subfield (page 1, paragraph 9, pages 7, 8, paragraphs 110-119, page 11, paragraphs 167-170).

Regarding Claim 4, Kawahara et al. discloses the ratio of the weight assigned to each subfield in said first subfield arrangement setting unit to the weight assigned to each subfield in said second subfield arrangement setting unit is approximately $m:n$ (where m and n are natural

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numbers, and $n \cdot m$) (page 1, paragraph 9, pages 7, 8, paragraphs 110-119, page 12, paragraphs 171,178-180).

Regarding Claim 5, Kawahara et al. discloses the subfields to be set for light emission when displaying an arbitrary gray scale level except low gray scale levels, said second subfield arrangement setting unit sets the most heavily weighted subfield for light emission along with at least one of the other subfields (page 1, paragraph 9, pages 7, 8, paragraphs 110-119, page 9, paragraphs 129-131).

Regarding Claim 6, Kawahara et al. discloses first subfield arrangement setting unit sets the arrangement of said plurality of subfields to achieve said first number of gray scale levels, m , and said second subfield arrangement setting unit sets the arrangement of said plurality of subfields to achieve said second number of gray scale levels, n (where m and n are natural numbers, and $n \cdot m$) (page 1, paragraph 9 discloses subfield assigned different weight of luminescent, directly related to gray scale, pages 7, 8, paragraphs 110-119, page 11, paragraphs 167-170, page 12, paragraphs 171,178-180).

Regarding Claim 7, Kawahara et al. discloses the number of gray scale levels, m , generated by said first subfield arrangement setting unit and the number of gray scale levels, n , generated by said second subfield arrangement setting unit have a relationship such that $(m-1):(n-1)$ is substantially equal to a ratio of integers (page 1, paragraph 9 discloses subfield

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assigned different weight of luminescent, directly related to gray scale, pages 7, 8, paragraphs 110-119, page 11, paragraphs 167-170, page 12, paragraphs 171,178-180).

Regarding Claim 8, Kawahara et al. discloses ratio $(m-1):(n-1)$ is 2:3, 4:5, or 4:7 (page 1, paragraph 9 discloses subfield assigned different weight of luminescent, directly related to gray scale, pages 7, 8, paragraphs 110-119, page 11, paragraphs 167-170, page 12, paragraphs 171,178-180 subfield 6 is assigned 32 and subfield is assigned 48, this gives ratio of 2:3).

Regarding Claim 9, Kawahara et al. discloses sub gain control circuit generates said second intermediate image signal with said second number of gray scale levels by compressing said first intermediate image signal with said first number of gray scale levels through multiplication with $(n-1)/(m-1)$ ((page 1, paragraph 9, page 11, paragraphs 167-170, page 12, paragraphs 171,178-180).

Regarding Claim 10, Mucci et al. discloses sub gain control circuit divides n gray scale levels into a plurality of regions, and performs the multiplication with said coefficient $(n-1)/(m-1)$ by approximating said divided regions by a broken line formed of a set of straight line segments each having a slope equal to a submultiple of a natural number (please see figure 4, Col. 15, Line 58-67, Col. 16, Lines 55-67, Col. 6, Lines 3-47, Col. 9, Line 37 to Col. 10, line 13).

Regarding Claim 11, Mucci et al. discloses the slope of each of said straight line segments in said broken line approximation is selected from the group consisting of 1, $1/2$, $1/3$,

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and $\frac{1}{4}$ (please see figure 4, Col. 15, Line 58-67, Col. 16, Lines 55-67, Col. 6, Lines 3-47, Col. 9, Line 37 to Col. 10, line 13).

Regarding Claim 12, Kawahara et al. discloses a weight setting unit multiplying each weight by $(m-1)/(n-1)$ in order to expand said image signal compressed through the multiplication with said coefficient $(n-1)/(m-1)$ in said sub gain control circuit and output via said error diffusion circuit (page 1, paragraph 9, pages 7, 8, paragraphs 110-119, page 11, paragraphs 167-170, page 12, paragraphs 171, 178-180). Mucci et al. discloses a weight setting unit multiplying each weight by $(m-1)/(n-1)$ in order to expand said image signal compressed through the multiplication with said coefficient $(n-1)/(m-1)$ in said sub gain control circuit and output via said error diffusion circuit (please see figure 4, Col. 15, Line 58-67, Col. 16, Lines 55-67, Col. 6, Lines 3-47, Col. 9, Line 37 to Col. 10, Line 13, mapping is established via vivid computations including multiplication).

Regarding Claim 13, Kawahara et al. discloses image signal is any one of RGB signals of red, green, and blue; and said gain control circuit, said sub gain control circuit, and said error diffusion circuit are provided for each of said RGB signals (page 3, paragraph 60, page 1, paragraph 9, pages 7, 8, paragraphs 110-119).

Regarding Claim 14, Kawahara et al. discloses display apparatus is a plasma display apparatus (page 3, paragraph 60, page 1, paragraph 4).

Response to Arguments

5. Applicant's election without traverse of election of group 1, Claims 1-14 in the reply filed on 08-30-2007 is acknowledged. The requirement is still deemed proper and is therefore made FINAL.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Shigeta; Tetsuya et al. (US 6,646,625 B1) Method for driving a plasma display panel.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prabodh M. Dharia whose telephone number is 571-272-7668. The examiner can normally be reached on M-F 8AM to 5PM.

8. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

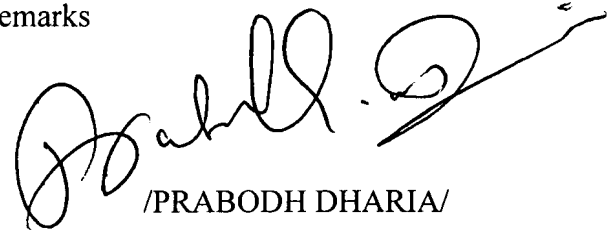
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like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

A handwritten signature in black ink, appearing to read 'Prabodh Dharia', with a stylized flourish at the end.

/PRABODH DHARIA/

Prabodh Dharia

Full Signatory Authority Program

AU2629

August 14, 2007